

CLAIMS

WE CLAIM:

1. A method of selectively forming non-covalent complexes and initiating intermolecular reactions with amine-containing compounds, comprising reacting the amine-containing compound with a second compound comprising at least one crown ether group and a moiety selected from acidic groups, transition metal binding groups and diazo groups.
2. The method of claim 1, wherein the crown ether is 18-crown-6 ether.
3. The method of claim 1, wherein the acidic group is benzoic acid.
4. The method of claim 1, wherein the transition metal binding group is selected from alkyls, heteroalkyls, alkenyls, heteroalkenyls, aryls, heteroaryls, alkaryls, and alkheteroaryls.
5. The method of claim 4, wherein the transition metal binding group is a polyamine.
6. The compound of claim 4, wherein the transition metal is selected from Ag(I), Fe(III), Co(II), Zn(I), Zn(II), Mn(II), Ni(II), Pd(II), Cu (I) and Cu(II).
7. The method of claim 1, wherein the diazo group is selected -C(N<sub>2</sub>)-.
8. The method of claim 1, wherein the moiety is attached to the crown ether group through an ether or an ester linker.
9. The method of claim 1, wherein the amine-containing compound comprises at least one protonated amine.
10. The method of claim 1, wherein the amine-containing compound comprises at least one primary amine.

11. The method of claim 1, wherein the amine-containing compound is a peptide or protein comprising at least one lysine.
12. The method of claim 1, wherein the formation of non-covalent complexes and initiation of intermolecular reactions is conducted in the gas phase.
13. The method of claim 1, wherein the formation of non-covalent complexes and initiation of intermolecular reactions is conducted in solution.
14. The method of claim 1, wherein the intermolecular reaction is the selective cleavage of a peptide backbone.
15. The method of claim 14, wherein the moiety is selected from acidic groups and transition metal binding groups.
16. The method of claim 1, wherein the non-covalent complex is formed with a peptide via carbene insertion chemistry.
17. The method of claim 16, wherein the moiety is a diazo group.
18. The method of claim 1, wherein the second compound further comprises a detectable label.
19. A compound capable of selectively forming non-covalent complexes and initiating intermolecular reactions with amine-containing compounds, comprising at least one crown ether group and a moiety selected from acidic groups, transition metal binding groups and diazo groups.
20. The compound of claim 19, wherein the crown ether is 18-crown-6 ether.

21. The compound of claim 19, which comprises one crown ether group.
22. The compound of claim 19, which comprises two crown ether groups.
23. The compound of claim 19, wherein the moiety is an acidic group.
24. The compound of claim 23, wherein the acidic group is benzoic acid.
25. The compound of claim 19, wherein the moiety is a transition metal binding group.
26. The compound of claim 25, wherein the transition metal binding group is selected from alkyls, heteroalkyls, alkenyls, heteroalkenyls, aryls, heteroaryls, alkaryls, and alkheteroaryls.
27. The method of claim 26, wherein the transition metal binding group is a polyamine.
28. The method of claim 27, wherein the transition metal binding group is phenanthroline.
29. The compound of claim 25, wherein the transition metal is selected from Ag(I), Fe(III), Co(II), Zn(I), Zn(II), Mn(II), Ni(II), Pd(II), Cu (I) and Cu(II).
30. The compound of claim 19, wherein the moiety is a diazo group.
31. The compound of claim 30, wherein the diazo group is  $-C(N_2)-$ .
32. The compound of claim 19, wherein the moiety is attached to the crown ether group through an ether or an ester linker.
33. The compound of claim 19, which further comprises a detectable label.